The Jibal Qutman deposit: first notes on a new gold discovery in the Arabian Shield (Kingdom of Saudi Arabia)

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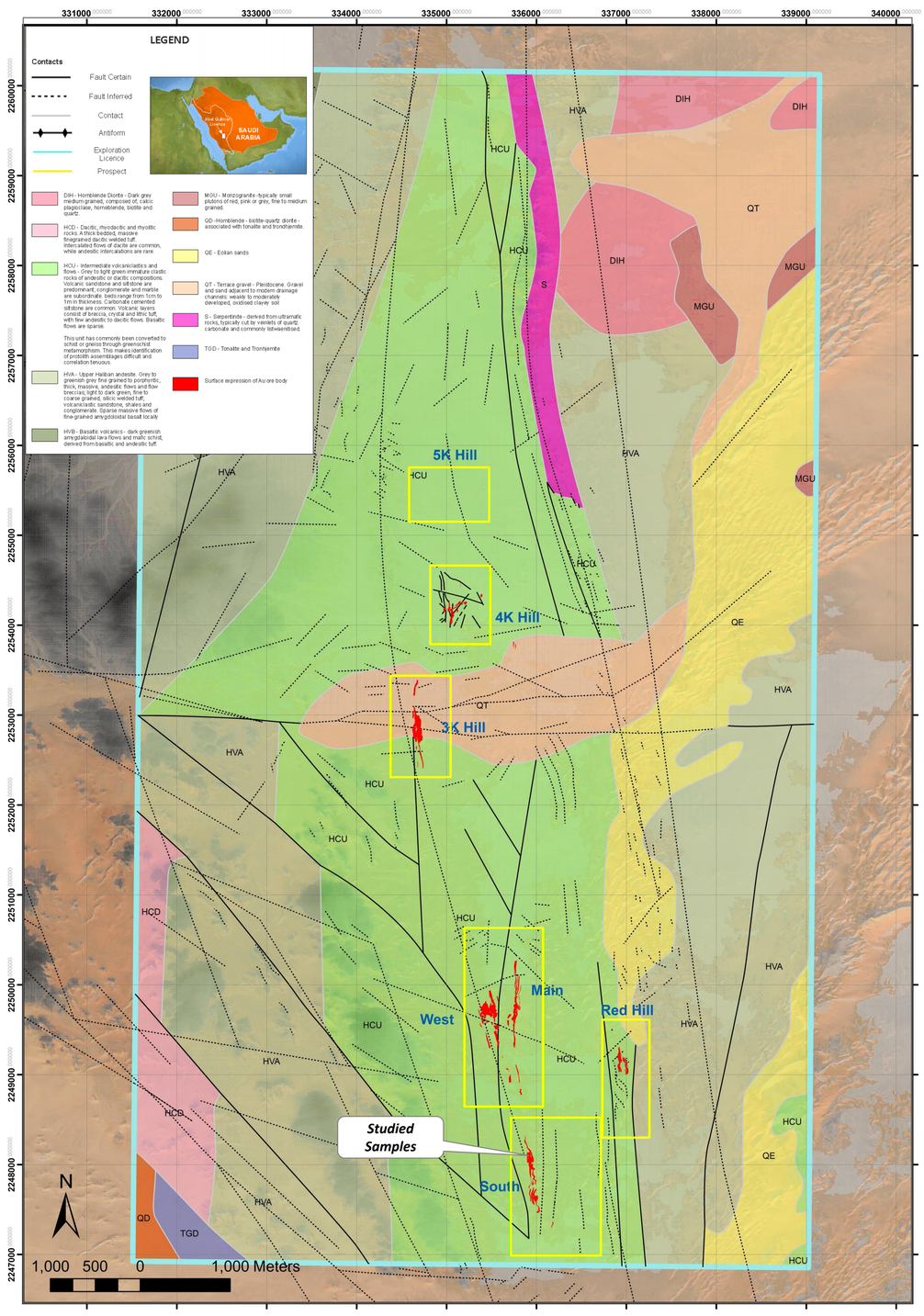
JIBAL QUTMAN
Geological and prospect map (data after F.S. Simons, 1988)



The Jibal Qutman gold deposit (Saudi Arabia) is located in the Asir Terrane (Arabian Shield), a composite Neoproterozoic terrane that includes volcanic, sedimentary and intrusive rocks. This terrane amalgamated between 780-640 Ma during the convergence of an oceanic domain interposed between the incoming east and west Gondwana (Johnson et al., 2011; Flowerdew et al., 2013).

The Nabitah-Tathlith fault zone (NTFZ) separates island arc sequences metamorphosed under greenschist facies, in the west, from paragneiss and amphibolites of the Hajizah Gneiss Belt in the east. Along the NTFZ, a belt containing over 40 gold deposit occurs (Worl, 1979). Among them, Jibal Qutman (24°16'N and 45° 04'E), is hosted by lower greenschist metavolcanics and metasediments (Halaban group: 785 Ma). The first study of the area was performed by the USGS on behalf of the then Directorate General of Mineral Resources (Hackett, 1983).

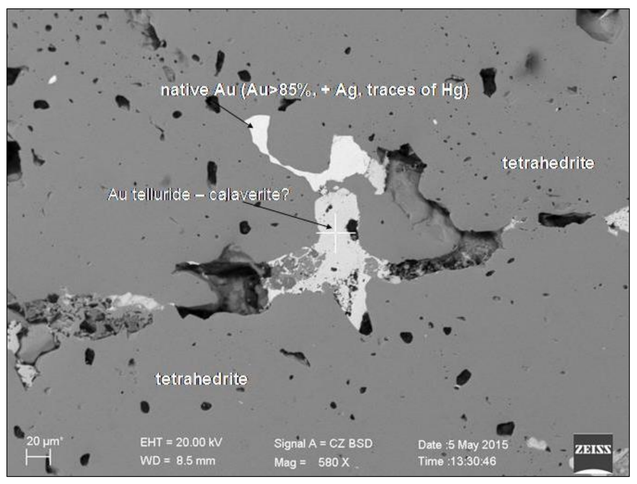
Recent exploration performed by Kefi Minerals PLC discovered seven Au mineralised zones in a 5 km long (N-S) and 1 km wide (E-W) area, with estimated 0.733 Moz of gold in indicated and inferred resources. Mineralisation zones are controlled by low-order structures subparallel to the NTFZ. Orebodies include veins, stockworks and disseminations, related to step dipping to low angle brittle to ductile shear zones marked by different stages of hydrothermal alteration and metasomatism.

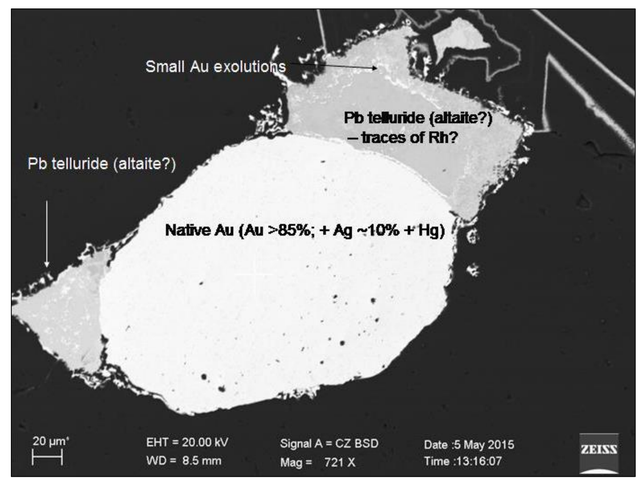
All mineralised zones show definite Au-Ag, Au-Te and (more locally) Au-Pb geochemical correlations; Au-Ag ratios range from 4:1 to 1:4 on average.

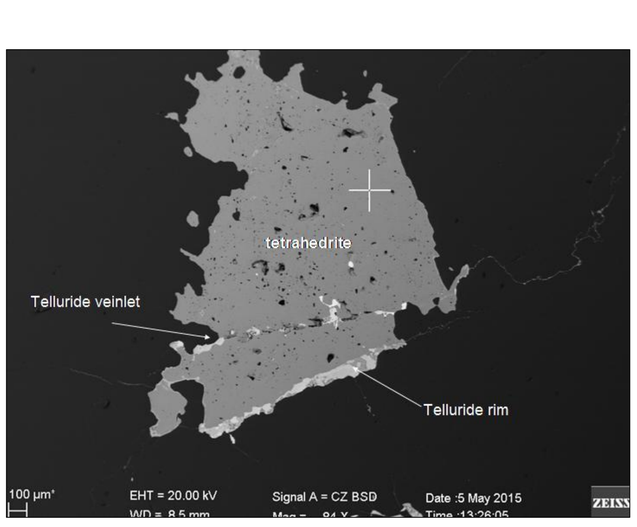
The Main Zone orebody is a 900 m-long, N-S quartz vein system, with a single high-angle vein up to 4 m thick that, along strike, splits into multiple veins. The ore consists of pyrite and minor tetrahedrite, galena and sphalerite with coarse gold.

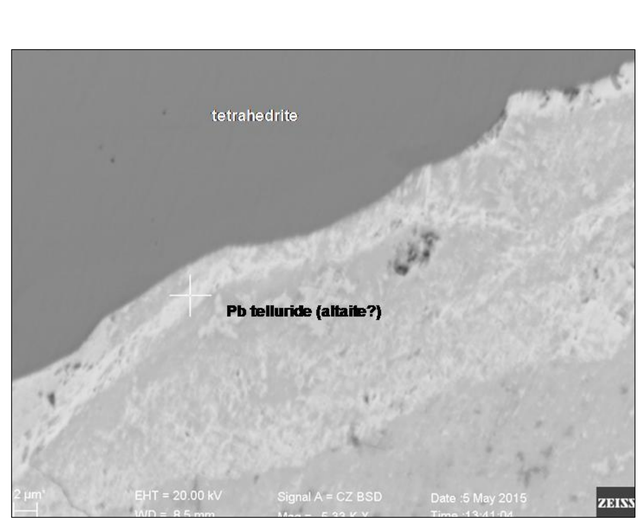
Ore microscopy and SEM-EDS studies identified a close association between native gold (Au > 85%, Ag 10-15%, traces of Hg), tetrahedrite (Zn- and Ag-bearing), and Pb and Au tellurides (possible altaite and Hg-bearing calaverite). Pb tellurides are mostly present as thin rims around tetrahedrite and major gold grains, while Au tellurides occur with gold as small droplets within tetrahedrite. Milky to sugary quartz is the only gangue mineral.

Jibal Qutman shows the features of a shear zone-hosted, mesothermal gold deposit. Different ore styles in the area derived from polyphasic mineralisation related to the ductile-brittle structural evolution of the NTFZ. From the marked Au-Te geochemical correlations, the Ag abundance, and the occurrence of tellurides with Sb- and Hg-bearing minerals, a mesozonal- to epizonal orogenic style of mineralisation (Groves et al., 1998) may be inferred.









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